General

Guideline Title

Clinical policy for well-appearing infants and children younger than 2 years of age presenting to the emergency department with fever.

Bibliographic Source(s)

Mace SE, Gemme SR, Valente JH, Eskin B, Bakes K, Brecher D, Brown MD, American College of Emergency Physicians. Clinical policy for well-appearing infants and children younger than 2 years of age presenting to the emergency department with fever. Ann Emerg Med. 2016 May;67(5):625-39.e13. [60 references] PubMed

Guideline Status

This is the current release of the guideline.

This guideline updates a previous version: American College of Emergency Physicians Clinical Policies Committee. Clinical policy for children younger than three years presenting to the emergency department with fever. Ann Emerg Med. 2003 Oct;42(4):530-45. [121 references]

This guideline meets NGC's 2013 (revised) inclusion criteria.

Recommendations

Major Recommendations

Definitions for the strength of evidence (Class I-III) and strength of recommendations (A-C) are provided at the end of the "Major Recommendations" field.

1. For well-appearing immunocompetent infants and children aged 2 months to 2 years presenting with fever (≥38.0°C [100.4°F]), are there clinical predictors that identify patients at risk for urinary tract infection?
   Level A recommendations. None specified.

   Level B recommendations. None specified.

   Level C recommendations. Infants and children at increased risk for urinary tract infection include females younger than 12 months, uncircumcised males, nonblack race, fever duration greater than 24 hours, higher fever (≥39°C), negative test result for respiratory pathogens, and no obvious source of infection. Although the presence of a viral infection decreases the risk, no clinical feature has been shown to effectively exclude urinary tract infection. Physicians should consider urinalysis and urine culture testing to identify urinary tract infection in well-appearing infants and children aged 2 months to 2 years with a fever ≥38°C (100.4°F), especially among those at higher risk for urinary tract infection.

2. For well-appearing febrile infants and children aged 2 months to 2 years undergoing urine testing, which laboratory testing method(s) should

be used to diagnose a urinary tract infection?
Level A recommendations. None specified.

Level B recommendations. Physicians can use a positive test result for any one of the following to make a preliminary diagnosis of urinary tract infection in febrile patients aged 2 months to 2 years: urine leukocyte esterase, nitrites, leukocyte count, or Gram's stain.

Level C recommendations.

1. Physicians should obtain a urine culture when starting antibiotics for the preliminary diagnosis of urinary tract infection in febrile patients aged 2 months to 2 years.
2. In febrile infants and children aged 2 months to 2 years with a negative dipstick urinalysis result in whom urinary tract infection is still suspected, obtain a urine culture.

3. For well-appearing immunocompetent infants and children aged 2 months to 2 years presenting with fever (≥38.0°C [100.4°F]), are there clinical predictors that identify patients at risk for pneumonia for whom a chest radiograph should be obtained?
Level A recommendations. None specified.

Level B recommendations. In well-appearing immunocompetent infants and children aged 2 months to 2 years presenting with fever (≥38°C [100.4°F]) and no obvious source of infection, physicians should consider obtaining a chest radiograph for those with cough, hypoxia, rales, high fever (≥39°C), fever duration greater than 48 hours, or tachycardia and tachypnea out of proportion to fever.

Level C recommendations. In well-appearing immunocompetent infants and children aged 2 months to 2 years presenting with fever (≥38°C [100.4°F]) and wheezing or a high likelihood of bronchiolitis, physicians should not order a chest radiograph.

4. For well-appearing immunocompetent full-term infants aged 1 month to 3 months (29 days to 90 days) presenting with fever (≥38.0°C [100.4°F]), are there predictors that identify patients at risk for meningitis from whom cerebrospinal fluid should be obtained?
Level A recommendations. None specified.

Level B recommendations. None specified.

Level C recommendations.

1. Although there are no predictors that adequately identify full-term well-appearing febrile infants aged 29 to 90 days from whom cerebrospinal fluid should be obtained, the performance of a lumbar puncture may still be considered.
2. In the full-term well-appearing febrile infant aged 29 to 90 days diagnosed with a viral illness, deferment of lumbar puncture is a reasonable option, given the lower risk for meningitis. When lumbar puncture is deferred in the full-term well-appearing febrile infant aged 29 to 90 days, antibiotics should be withheld unless another bacterial source is identified. Admission, close follow-up with the primary care provider, or a return visit for a recheck in the emergency department (ED) is needed. (Consensus recommendation)

Definitions

Strength of Evidence

*Literature Classification Schema**

Design/Class	Therapy†	Diagnosis‡	Prognosis§
1	Randomized controlled trial or meta-analysis of randomized trials	Prospective cohort using a criterion standard or meta-analysis of prospective studies	Population prospective cohort or meta-analysis of prospective studies
2	Nonrandomized trial	Retrospective observational	Retrospective cohort Case control
3	Case series Case report Other (e.g., consensus, review)	Case series Case report Other (e.g., consensus, review)	Case series Case report Other (e.g., consensus, review)

*Some designs (e.g., surveys) will not fit this schema and should be assessed individually.

†Objective is to measure therapeutic efficacy comparing interventions.

‡Objective is to determine the sensitivity and specificity of diagnostic tests.

§Objective is to predict outcome, including mortality and morbidity.

*Approach to Downgrading Strength of Evidence**

Downgrading	Design/Class		
	1	2	3
None	I	II	III
1 level	II	III	X
2 levels	III	X	X
Fatally flawed	X	X	X

*See the "Description of Methods Used to Analyze the Evidence" field for more information.

Strength of Recommendations

Strength of recommendations regarding each critical question were made by subcommittee members using results from strength of evidence grading, expert opinion, and consensus among subcommittee members according to the following guidelines:

Level A recommendations. Generally accepted principles for patient care that reï¬ect a high degree of clinical certainty (e.g., based on evidence from 1 or more Class of Evidence I or multiple Class of Evidence II studies).

Level B recommendations. Recommendations for patient care that may identify a particular strategy or range of strategies that reï¬ect moderate clinical certainty (e.g., based on evidence from 1 or more Class of Evidence II studies or strong consensus of Class of Evidence III studies).

Level C recommendations. Recommendations for patient care that are based on evidence from Class of Evidence III studies or, in the absence of any adequate published literature, based on expert consensus. In instances where consensus recommendations are made, "consensus" is placed in parentheses at the end of the recommendation.

There are certain circumstances in which the recommendations stemming from a body of evidence should not be rated as highly as the individual studies on which they are based. Factors such as heterogeneity of results, uncertainty about effect magnitude and consequences, and publication bias, among others, might lead to such a downgrading of recommendations.

Clinical Algorithm(s)

None provided

Scope

Disease/Condition(s)

Fever (≥38.0°C [100.4°F])

Guideline Category

Diagnosis

Evaluation

Management

Clinical Specialty

Emergency Medicine

Family Practice

Infectious Diseases

Pediatrics

Intended Users

Physicians

Guideline Objective(s)

- To address key issues for well-appearing infants and children younger than 2 years presenting to the emergency department with fever
- To derive evidence-based recommendations to answer the following clinical questions:
  - For well-appearing immunocompetent infants and children aged 2 months to 2 years presenting with fever (≥38.0°C [100.4°F]), are there clinical predictors that identify patients at risk for urinary tract infection?
  - For well-appearing febrile infants and children aged 2 months to 2 years undergoing urine testing, which laboratory testing method(s) should be used to diagnose a urinary tract infection?
  - For well-appearing immunocompetent infants and children aged 2 months to 2 years presenting with fever (≥38.0°C [100.4°F]), are there clinical predictors that identify patients at risk for pneumonia for whom a chest radiograph should be obtained?
  - For well-appearing immunocompetent full-term infants aged 1 month to 3 months (29 days to 90 days) presenting with fever (≥38.0°C [100.4°F]), are there predictors that identify patients at risk for meningitis from whom cerebrospinal fluid should be obtained?

Target Population

Well-appearing infants and children younger than 2 years presenting to the emergency department with fever

Note: This guideline applies to previously healthy term infants and children, appropriately immunized for age, with ages as described in each critical question. This guideline excludes neonates, prematurely born infants, and pediatric patients considered to be at high risk such as those with significant congenital abnormalities, with serious illnesses preceding the onset of fever, and in an immunocompromised state.

Interventions and Practices Considered

1. Urinalysis and urine culture to identify urinary tract infection
2. Urine leukocyte esterase, nitrites, leukocyte count, or Gram's stain to make a preliminary diagnosis of urinary tract infection
3. Chest radiograph to identify patients at risk for pneumonia (for immunocompetent infants and children aged 2 months to 2 years with no obvious source of infection, and with cough, hypoxia, rales, high fever [≥39º C], fever duration >48 hours, or tachycardia and tachypnea out of proportion to fever)
4. Lumbar puncture to obtain cerebrospinal fluid to assess for meningitis

Major Outcomes Considered

- Differentiation of the well-appearing febrile infant or child with a serious bacterial infection (SBI) from the febrile infant or child with a benign, usually viral infection
- Sensitivity, specificity, and likelihood ratios of diagnostic tests

Methodology

Methods Used to Collect/Select the Evidence

Hand-searches of Published Literature (Primary Sources)

Hand-searches of Published Literature (Secondary Sources)

Searches of Electronic Databases

Description of Methods Used to Collect/Select the Evidence

This clinical policy was created after careful review and critical analysis of the medical literature and was based on a systematic review of the literature. Searches of MEDLINE, MEDLINE InProcess, Scopus, Web of Science, and the Cochrane Database were performed. All searches were limited to English-language sources and human studies. Specific key words/phrases, years used in the searches, dates of searches, and study selection are identified under each critical question in the original guideline document. In addition, relevant articles from the bibliographies of included studies and more recent articles identified by committee members and reviewers were included.

Number of Source Documents

Study Selection

Critical Question 1

Three hundred seventy-three articles were identified in the search. Twenty-six articles were selected from the search results for further review, with 2 studies included for this critical question.

Critical Question 2

Four hundred ninety-two articles were identified in the search. One hundred nine articles were selected from the search results for further review, with 10 studies included for this critical question.

Critical Question 3

Four hundred seventy-three articles were identified in the search. Sixty-four articles were selected from the search results for further review, with 9 studies included for this critical question.

Critical Question 4

Six hundred sixty-one articles were identified in the search. Sixty-eight articles were selected from the search results for further review, with 1 study included for this critical question. Studies that did not report subgroup analysis of the specific age groups noted in the question were not included.

Methods Used to Assess the Quality and Strength of the Evidence

Weighting According to a Rating Scheme (Scheme Given)

Rating Scheme for the Strength of the Evidence

Strength of Evidence

Literature Classification Schema*

Design/Class	Therapy†	Diagnosis‡	Prognosis§
1	Randomized controlled trial or meta-analysis of randomized trials	Prospective cohort using a criterion standard or meta-analysis of prospective studies	Population prospective cohort or meta-analysis of prospective studies
2	Nonrandomized trial	Retrospective observational	Retrospective cohort Case control
3	Case series	Case series	Case series

Design/Class	Case report **Therapy†** Other (e.g., consensus, review)	Case report **Diagnosis‡** Other (e.g., consensus, review)	Case report **Prognosis§** Other (e.g., consensus, review)

*Some designs (e.g., surveys) will not fit this schema and should be assessed individually.

†Objective is to measure therapeutic efficacy comparing interventions.

‡Objective is to determine the sensitivity and specificity of diagnostic tests.

§Objective is to predict outcome, including mortality and morbidity.

Approach to Downgrading Strength of Evidence*

Downgrading	Design/Class		
	1	**2**	**3**
None	I	II	III
1 level	II	III	X
2 levels	III	X	X
Fatally flawed	X	X	X

*See the "Description of Methods Used to Analyze the Evidence" field for more information.

Methods Used to Analyze the Evidence

Review of Published Meta-Analyses

Systematic Review with Evidence Tables

Description of the Methods Used to Analyze the Evidence

Assessment of Classes of Evidence

All articles used in the formulation of this clinical policy were graded by at least 2 methodologists and assigned a Class of Evidence. Each article was assigned a design class with design 1 representing the strongest study design and subsequent design classes (i.e., design 2, design 3) representing respectively weaker study designs for therapeutic, diagnostic, or prognostic clinical reports, or meta-analyses (see the "Rating Scheme for the Strength of the Evidence" field). Articles were then graded on dimensions related to the study's methodological features, such as randomization processes, blinding, allocation concealment, methods of data collection, outcome measures and their assessment, selection and misclassification biases, sample size, and generalizability. Using a predetermined process related to the study's design, methodological quality, and applicability to the critical question, articles received a final Class of Evidence grade (i.e., Class I, Class II, Class III, or Class X) (see the "Rating Scheme for the Strength of the Evidence" field). Articles identified with fatal flaws or that were ultimately not applicable to the critical question received a Class of Evidence grade "X" and were not used in formulating recommendations for this policy. Grading was done with respect to the specific critical questions; thus, the level of evidence for any one study may vary according to the question for which it is being considered. As such, it was possible for a single article to receive different Classes of Evidence as different critical questions were answered from the same study. Question-specific Classes of Evidence grading may be found in the Evidentiary Table in the original guideline document.

Methods Used to Formulate the Recommendations

Expert Consensus

Description of Methods Used to Formulate the Recommendations

This policy is a product of the American College of Emergency Physicians (ACEP) clinical policy development process, including expert review, and is based on the existing literature; when literature was not available, consensus of emergency physicians was used.

When possible, clinically oriented statistics (e.g., likelihood ratios [LRs], number needed to treat) are presented to help the reader better understand how the results may be applied to the individual patient. For a definition of these statistical concepts, see Appendix C in the original guideline document.

Rating Scheme for the Strength of the Recommendations

Strength of recommendations regarding each critical question were made by subcommittee members using results from strength of evidence grading, expert opinion, and consensus among subcommittee members according to the following guidelines:

Strength of Recommendations

Level A recommendations. Generally accepted principles for patient care that reflect a high degree of clinical certainty (e.g., based on evidence from 1 or more Class of Evidence I or multiple Class of Evidence II studies).

Level B recommendations. Recommendations for patient care that may identify a particular strategy or range of strategies that reflect moderate clinical certainty (e.g., based on evidence from 1 or more Class of Evidence II studies or strong consensus of Class of Evidence III studies).

Level C recommendations. Recommendations for patient care that are based on evidence from Class of Evidence III studies or, in the absence of any adequate published literature, based on expert consensus. In instances where consensus recommendations are made, "consensus" is placed in parentheses at the end of the recommendation.

There are certain circumstances in which the recommendations stemming from a body of evidence should not be rated as highly as the individual studies on which they are based. Factors such as heterogeneity of results, uncertainty about effect magnitude and consequences, and publication bias, among others, might lead to such a downgrading of recommendations.

Cost Analysis

A formal cost analysis was not performed and published cost analyses were not reviewed.

Method of Guideline Validation

External Peer Review

Internal Peer Review

Description of Method of Guideline Validation

Expert review comments were received from emergency physicians, members of the American Academy of Pediatrics (AAP) and American Academy of Family Physicians, and the American College of Emergency Physicians' (ACEP's) Pediatric Emergency Medicine Committee. Comments were received during a 60-day open comment period, with notices of the comment period sent in an e-mail to ACEP members, published in *EM Today*, and posted on the ACEP Web site. The responses were used to further refine and enhance this policy; however, the responses do not imply endorsement of this clinical policy.

This clinical policy was approved by the American College of Emergency Physicians (ACEP) Board of Directors on January 27, 2016.

This clinical policy was endorsed by the Emergency Nurses Association on February 29, 2016.

Evidence Supporting the Recommendations

Type of Evidence Supporting the Recommendations

The type of supporting evidence is identified and graded for each recommendation (see the "Major Recommendations" field).

Recommendations for question 1 were based on 2 Class III studies. Recommendations for question 2 were based on 2 Class II studies and 8 Class III studies. Recommendations for question 3 were based on 1 Class II study and 8 Class III studies. Recommendations for question 4 were based on 1 Class III study.

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

See the "Potential Benefits" sections in Appendix D in the original guideline document for information on potential benefits of the specific interventions.

Potential Harms

See the "Potential Harms" sections in Appendix D in the original guideline document for information on potential harms of the specific interventions.

Qualifying Statements

Qualifying Statements

- Policy statements and clinical policies are the official policies of the American College of Emergency Physicians (ACEP) and, as such, are not subject to the same peer review process as articles appearing in the journal. Policy statements and clinical policies of ACEP do not necessarily reflect the policies and beliefs of *Annals of Emergency Medicine* and its editors.
- This policy is not intended to be a complete manual on the evaluation and management of young pediatric patients with fever but rather a focused examination of critical issues that have particular relevance to the current practice of emergency medicine.
- It is the goal of the Clinical Policies Committee to provide an evidence-based recommendation when the medical literature provides enough quality information to answer a critical question. When the medical literature does not contain adequate empirical data to answer a critical question, the members of the Clinical Policies Committee believe that it is equally important to alert emergency physicians to this fact.
- This clinical policy is not intended to represent a legal standard of care for emergency physicians. Recommendations offered in this policy are not intended to represent the only diagnostic or management options available to the emergency physician. ACEP recognizes the importance of the individual physician's judgment and patient preferences. This guideline defines for the physician those strategies for which medical literature exists to provide support for answers to the critical questions addressed in this policy.

Implementation of the Guideline

Description of Implementation Strategy

An implementation strategy was not provided.

Implementation Tools

Mobile Device Resources

For information about availability, see the *Availability of Companion Documents* and *Patient Resources* fields below.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Getting Better

IOM Domain

Effectiveness

Identifying Information and Availability

Bibliographic Source(s)

Mace SE, Gemme SR, Valente JH, Eskin B, Bakes K, Brecher D, Brown MD, American College of Emergency Physicians. Clinical policy for well-appearing infants and children younger than 2 years of age presenting to the emergency department with fever. Ann Emerg Med. 2016 May;67(5):625-39.e13. [60 references] PubMed

Adaptation

Not applicable: The guideline was not adapted from another source.

Date Released

2016 May

Guideline Developer(s)

American College of Emergency Physicians - Medical Specialty Society

Source(s) of Funding

The American College of Emergency Physicians (ACEP) was the funding source for this clinical policy.

Guideline Committee

American College of Emergency Physicians (ACEP) Clinical Policies Subcommittee (Writing Committee) on Pediatric Fever

ACEP Clinical Policies Committee (Oversight Committee)

Composition of Group That Authored the Guideline

Members of the Subcommittee on Pediatric Fever: Sharon E. Mace, MD (*Subcommittee Chair*); Seth R. Gemme, MD; Jonathan H. Valente, MD; Barnet Eskin, MD, PhD; Katherine Bakes, MD; Deena Brecher, MSN, RN, APN, ACNS-BC, CEN, CPEN (*ENA Representative*); Michael D. Brown, MD, MSc (*Committee Chair*)

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Financial Disclosures/Conflicts of Interest

Relevant industry relationships: There were no relevant industry relationships disclosed by the subcommittee members for this topic. One Clinical Policies Committee member was recused from voting on recommendations due to a spousal relationship with industry.

Relevant industry relationships are those relationships with companies associated with products or services that significantly impact the specific aspect of disease addressed in the critical question.

Guideline Endorser(s)

Emergency Nurses Association - Professional Association

Guideline Status

This is the current release of the guideline.

This guideline updates a previous version: American College of Emergency Physicians Clinical Policies Committee. Clinical policy for children younger than three years presenting to the emergency department with fever. Ann Emerg Med. 2003 Oct;42(4):530-45. [121 references]

This guideline meets NGC's 2013 (revised) inclusion criteria.

Guideline Availability

Available from the American College of Emergency Physicians (ACEP) Web site .

A summary of this guideline optimized for mobile viewing is available under the CQ tab at the ACEP Web site .

Availability of Companion Documents

The following are available:

- American College of Emergency Physicians clinical policy development. Irving (TX): American College of Emergency Physicians (ACEP); 3 p. Available from the American College of Emergency Physicians (ACEP) Web site .
- ACEP clinical policy development process. Flow chart. Irving (TX): American College of Emergency Physicians (ACEP); 1 p. Available from the ACEP Web site .

Patient Resources

None available

NGC Status

This NGC summary was completed by ECRI on April 21, 2004. The information was verified by the guideline developer on June 10, 2004. This summary was updated by ECRI Institute on August 16, 2016. The information was verified by the guideline developer on September 7, 2016.

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